

[JP,11-323899,A(1999)]

Japanese (PDF)

File Wrapper Information

FULL CONTENTS CLAIM + DETAILED DESCRIPTION
TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION MEANS DESCRIPTION OF DRAWINGS
DRAWINGS

[Translation done.]

Disclaimer:

This English translation is produced by machine translation and may contain errors. The JPO, the INPIT, and those who drafted this document in the original language are not responsible for the result of the translation.

Notes:

1. Untranslatable words are replaced with asterisks (*).
2. Texts in the figures are not translated and shown as it is.

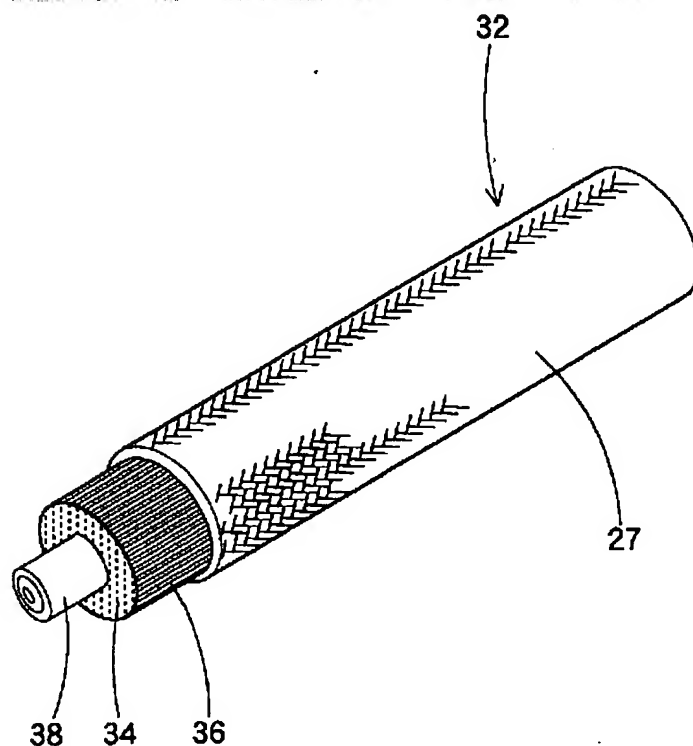
Translated: 00:46:00 JST 05/12/2010

Dictionary: Last updated 03/12/2010 / Priority: 1. Medical/Pharmaceutical sciences / 2. Manufacturing/Quality / 3. Technical term

FULL CONTENTS**[Claim(s)]**

[Claim 1] It is the wastewater material for engineering works used laying underground in a system in order to discharge water which permeated in a system of engineering-works equipment out of a system, In what is constituted so that a hydrophilic linear object of a book may pull, and said a majority of wastewater material may be arranged, or may consist of a string-like object twisted and formed, may make water invade from the surface side and may move a crevice between said hydrophilic linear objects for this water to a system outside direction, Wastewater material for engineering works characterized by carrying out burial retention of the linear heater along with a longitudinal direction of said string-like object.

[Claim 2] Wastewater material for engineering works to which said hydrophilic linear object is an inorganic fiber, and a form of said string-like object is characterized by dispelling in a system a strand bunch pulled and arranged at the time of burial, binding a peripheral face improper so that

Drawing selection **Representative draw**

[Translation done.]

water penetration is possible, and holding by a member.

[Claim 3] Wastewater material for engineering works, wherein said hydrophilic linear objects are an inorganic fiber and/or polar organicity textiles and forms of said string-like object are **** material thru/or rope material.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the wastewater material for engineering works used laying underground in a system, in order to discharge the water which permeated in the system of engineering-works equipment out of a system. In particular, in highway bridges, such as a bridge and a viaduct, it is related with the suitable wastewater material for engineering works to construct [lay underground when constructing a pavement layer on the upper surface of a water resistant layer (tarpaulin), and] drainage structure.

[0002] Here, although a highway bridge is mainly taken and explained to an example as engineering-works equipment, the wastewater material of this invention is applicable also to the drainage structure under [of the road surface pavement in the usual passage] a pavement layer, and drainage structure [in / further / banking the object for passages, for orbital fundamentals, etc.].

[0003]

[Background of the Invention] The general composition of a highway bridge is explained based on drawing 1 - 3.

[0004] The tarpaulin (water resistant layer) 14 is formed on the basic base 12 which equipped both sides with the marginal protruding line part (foundation part) 13, and pavement slab (asphalt or concrete) 20 which consists of the basis 16 and the surface 18 on the water resistant layer 14 is given. And in order to absorb inflation and systole to the pavement board by a temperature change, the horizontal joint 22 is formed in the pavement slab 20 at intervals of about 20-30 m.

[0005] In order to drain the water on the pavement slab 20, the following drainage structures are constructed.

[0006] That is, the catch basin 26 with which the wastewater pipe 24 was connected to the pars basilaris ossis occipitalis forms in the central part further near the both sides of the horizontal joint 22 if needed. And water flows along with the marginal height (foundation part) 13 or the horizontal joint (joint) 22 formed in the both sides of the basic base 12, and storage of water of the upper surface of the pavement slab 20 flows.

[0007] Although the water which permeated between the

pavement slab 20 and the water resistant layer 14 is also little, being discharged quickly and smoothly is desirable. If water stagnates between the pavement slab 20 and the water resistant layer 14, the pavement slab 20 will be damaged (when reinforcing members, such as a wire mesh and a steel rod, are laid underground). those cauterization -- including -- it is because there is a possibility that it is easy to promote, and seepage water is frozen, and a protuberance thru/or a cave-in may occur in the intense-cold place in winter especially when extreme, the crack of the pavement slab 20 and.

[0008]For this reason, as shown in drawing 2 - 3, laying under the pavement slab 20 the means of water disposal 23 which consists of spiral steel basis 16, and forming it in it on the water resistant layer 14, along with the intermediate part and the marginal protruding line part 13 of the joint 22, is proposed.

[0009]However, it cannot say that a wastewater cross-section area is small and wastewater capability is not necessarily enough only by being drained along with spiral steel in the above-mentioned composition, but with metal, since a coefficient of heat transmission is also high, the water of adhesion to spiral steel also tends to freeze spiral steel.

[0010]That is, it was difficult to fully solve the above-mentioned problem generated when water stagnates between the pavement slab 20 and the water resistant layer 14.

[0011]This invention can perform quick and smooth eccrisis of the water which permeated between on a water resistant layer via pavement slab in view of the above, and an object of this invention is to provide the wastewater material for engineering works which can moreover prevent freezing in winter completely.

[0012]

[Means for solving problem]The wastewater material for engineering works concerning this invention solves above-mentioned SUBJECT by the following composition.

[0013]It is the wastewater material for engineering works used laying underground in a system in order to discharge the water which permeated in the system of engineering-works equipment out of a system, In what is constituted so that the hydrophilic linear object of a book may pull, and many wastewater material may be arranged, or may consist of a string-like object twisted and formed, may make water invade from the surface side and may move the crevice between said hydrophilic linear objects for this water to a system outside direction, Burial retention of the linear heater is carried out along with the longitudinal direction of said string-like object.

[0014]In the above, as one mode of this invention, the

hydrophilic linear object was made into the inorganic fiber, the strand bunch which pulled and arranged the form of the string-like object was dispelled in the system at the time of burial, and improper, the peripheral face should be bound and should be held by the member so that water penetration was possible.

[0015]As other modes of this invention, a hydrophilic linear object is made into an inorganic fiber and/or polar organicity textiles, and ***** which the form of said string-like object makes **** material thru/or rope material is made.

[0016]

[Mode for carrying out the invention]Next, based on one embodiment, detailed explanation is given for this invention.

[0017]The wastewater material for engineering works of this invention is used laying underground in a system, in order to discharge the water which permeated in the system of engineering-works equipment out of a system. With engineering-works equipment, banking of the above-mentioned highway bridge, a passage, an orbital fundamental, etc., etc. is also included here. Here, the above-mentioned highway bridge is taken and explained mainly to an example.

[0018]Much fundamentally, this wastewater material 32 is constituted so that the hydrophilic linear object 34 of a book may pull, and it may be arranged, or may consist of the string-like object 36 twisted and formed, water may be made to invade from the surface side and the crevice between said hydrophilic linear objects 34 may be moved for this water to a system outside direction. And along with the longitudinal direction of the string-like object 36, burial retention of the linear heater 38 is carried out.

[0019]Here, as the linear heater 38, if it has heat resistance when laying under the pavement slab 20 further, flexibility and water resistance, and, it will not be limited in particular. Specifically, what is marketed from Ozeki chemical industry incorporated company by the brand name of the "parula in heater" can be used. the composition covers the circumference of linear resistance heating element 52 **, such as graphite, with the heat-resistant textiles 54 like aromatic polyamide (ARAMIDO) textiles, as shown in drawing 7 -- further -- the heat-resistant polymer materials 56, such as ethylene-propylene rubber, polyurethane rubber, and PVC, -- much more -- or multilayer reinforcement is carried out.

[0020]As shown in drawing 4, one mode of the wastewater material 32 used for this invention undoes the string-like object 36 which consists of a strand bunch (glass fiber bunch) which pulled and arranged the hydrophilic linear

object 34 to the basis 16 of the pavement slab 20 at the time of burial, improper, binds a peripheral face and holds it by the member 27 so that water penetration is possible. Here, it binds, and although a metal wire and a string may be sufficient as the member 27, a standpoint to the flexible tube-like object 27 which protects the peripheral face of the glass fiber bunch 36 is desirable [the member]. That is, restoration retention of the glass fiber bunch 36 is carried out at the flexible tube-like object 27.

[0021]A glass fiber bunch is pulled and arranged in order to form a capillary tube between textiles (what was made filar is included). Using glass fiber, [glass fiber] While a solubility parameter (SP value) is higher than metal and it is rich in the wettability (hydrophilicity) to water, Even if a modulus in torsion is high, and heat resistance is high and the heat asphalt which forms the pavement slab 20 from dumping etc. is dropped, it is because there is no possibility that there may be no possibility that a capillary tube may be blockaded by the dropping impact concerned, and it may be risked by asphalt heat. As opposed to incidentally the modulus in torsion of glass being abbreviation $2.5 \times 10^{11} \text{ dyn/cm}^2$ ($2.5 \times 10^6 \text{ N/cm}^2$), [Nylon 66 which is a representation polymer material of polar textiles] Abbreviation $1.22 \times 10^{10} \text{ dyn/cm}^2$ ($1.22 \times 10^4 \text{ N/cm}^2$) and the modulus in torsion of glass are high about 20 times as compared with a polar polymer (Nakagawa Tsuru [Taro] work "the 2nd edition of rheology" 1978-2-23, Iwanami Shoten; P.39, table 2 and 1 reference).

[0022]Although the inorganic fiber bunch provided with the modulus in torsion equivalent to glass fiber may be used instead of a glass fiber bunch, while it is expensive, in hydrophilicity etc., a thing with a problem also has carbon fiber etc. and glass fiber's are desirable.

[0023]Here, although the glass fiber (or thread) which constitutes a glass fiber bunch uses the thing of a filament, what carried out the silk thread spun of the staple may usually be sufficient as it. And 0.5-100 micrometers of thickness [1-50 micrometers of] of the glass fiber used as the proximate principle of a fiber bundle or glass fiber yarn shall be 5-30 micrometers still more desirably desirably. In particular, the standpoint of handling nature to bulky nature yarn of glass fiber is desirable.

[0024]The thickness of glass fiber becomes difficult [influence *****] while a capillary tube's becoming thin too much and becoming easy to generate a problem in water flow capability, i.e., wastewater nature, if too thin. A thing of 0.5 micrometer or less is difficult to manufacture. On the other hand, if the thickness of glass fiber is too thick, the flexibility of a glass fiber bunch will be checked, namely, the flexibility of wastewater material will be checked, and it

will become easy to generate a problem to the handling nature of wastewater material.

[0025]To the flexible tube-like object 27, 10 to 80%, desirably, a capacity filling factor holds the glass fiber bunch 36 to the flexible tube-like object 27 so that it may become 10 to 50%. the time of replacing by the specific gravity of wastewater material (sum total) -- 0.2-1 -- the glass fiber bunch 36 is held to the flexible tube-like object 27 so that it may be desirably set to 0.3-0.6. If a capacity filling factor is too high, while wastewater efficiency falls, the flexibility of wastewater material falls and it is not desirable from the standpoint of the handling nature of wastewater material. On the other hand, when the capacity filling factor was too low and it lays under the basis 16 of the pavement slab 20 while becoming easy to generate a problem in the holdout of a glass fiber bunch, with earth pressure, a section changes, and it becomes an ellipse section of the shape (close to a linear section) of flat [the section of a desirable abbreviated perfect circle to] from the standpoint of wastewater efficiency, and is not desirable.

[0026]At this time, although the path of the flexible tube-like object 27 32, i.e., wastewater material, changes with demand wastewater capability between the pavement slab 20 and the water resistant layer 14, it shall usually be 10-100 mm desirably 5-200 mm. If a path is too large, while manufacture is difficult, when it lays underground, it becomes a foreign body, and there is a possibility of having a bad influence on the strength of the pavement slab 20. on the other hand, if a path is too small, it will be changed and damaged with the heat asphalt etc. which are abandoned from a dump truck etc. at the time of burial -- it is afraid. When the wastewater material 32 is too thin and there are a deformation and a possibility that it may be damaged, the wastewater material 32 may be bundled and used like the after-mentioned.

[0027]If maintenance of the bunch form of the glass fiber bunch 36 is possible for the flexible tube-like object 27, it is not limited in particular but a braid (braiding), stockinet (knitting), its spiral volume, etc. are arbitrary in thread (textiles). That is, pulling out the glass fiber bunch 36 which carried out the roll volume, it lets out thread from the bobbin of a braiding machine, a knitting machine, or a spiral volume machine, and the flexible tube-like object 27 is formed.

[0028]The area numerical aperture of the flexible tube-like object 27 is desirably made into 50 to 80% not less than 30%. If a numerical aperture is small, it will have a bad influence on water permeability, and if a numerical aperture is too high, the protective action of the glass fiber bunch 36 will fall.

[0029]the cloth object which carries out the spiral volume of the tape body which has water permeability or hydrophilicity to dense (unsuitable when it does not have water permeability), or **, or has water permeability -- weld -- or ** arrival may carry out and it may form.

[0030]although the polar organicity textiles which have hydrophilicity may be sufficient as the textiles (thread) which form the above-mentioned flexible tube-like object when heat resistance is seldom required like the object for banking, etc. -- glass fiber (thread) -- hydrophilicity, strength, and heat resistance -- and there is no fear of the environmental pollution in the case of pavement slab withdrawal, and it is still more desirable.

[0031]As polar textiles, various natural fibers, such as various synthetic fibers, such as a polyamide system, a polyester system, and a polyvinyl-alcohol system, and also hemp, cotton, silk, can be used conveniently. As a polyamide system, aromatic polyamide, such as fatty-series polyamide, such as Nylon 66, Kevlar, and no MEKKUSU, and the thing which uses alicyclic polyamide etc. as a base further can be used.

[0032]The above-mentioned glass fiber can use conveniently what was used for the glass fiber bunch.

[0033]In the above, although the glass fiber bunch was taken and explained to the example as a strand bunch pulled and arranged, when heat resistance and pressure-proofing are seldom required, it may consist of polar organicity textiles thru/or resin, and the above-mentioned strand bunch may be constituted. It is because it is not necessary to take into consideration that a capillary tube is blockaded by a dropping impact and the thermal effect. For example, the synthetic fiber thru/or synthetic resin which consists of hydrophilic polymer, such as fatty-series polyamide, aromatic polyamide, polyester, and vinylon (POBARU), can be used conveniently.

[0034]Here, when forming a strand using a synthetic fiber, the thickness of a synthetic fiber and the mode of strand formation presuppose that it is the same as that of the case of glass fiber, and abbreviation.

[0035]The ram bar (extrusion string) which pushed out the synthetic resin in thickness of 0.2-1 mm desirably 0.1-2 mm according to the resistance to pressure and drainage capacity as which the thickness is required when forming a ***** strand may be used.

[0036]As a mode of the wastewater material 32, although the above-mentioned mode is preferred, as shown in drawing 5, as the string-like object 36, it may consist of an inorganic fiber and/or polar organicity textiles, and what was formed by the twisted **** material thru/or rope material which can let water flow in capillary tube may be

used. Although the example of a figure twists six **** 39 and is formed in the surroundings of the linear heater 38, it may not be limited to the thing of the example of a figure, but may be an eight rope structure and also a plaited cord structure (**** crosses mutually and is constituted.).

[0037]As the above-mentioned inorganic fiber, although glass fiber can use it conveniently, other inorganic fibers inferior to hydrophilicity and polar organicity textiles may be made intermingled, and may be used, forming (in single yarn and **** unit). As polar organicity textiles, the above-mentioned thing can be used conveniently.

[0038]The above-mentioned wastewater material 32 is used like the above-mentioned spiral steel (means of water disposal), laying under the basis 16 of the pavement slab 20, as shown in drawing 2 - 3.

[0039]Although it changes with wastewater ability etc. as which the allocation pitch of the wastewater material 32 is required at this time, they may be 1-5m.

[0040]It is easy to be natural even if it uses it, laying under the banking 42, as shown in drawing 6.

[0041]For example, one by one, for every predetermined height, it allocates length and horizontally in the shape of meshes of a net, and it lays earth one by one and goes. Usually, the wastewater material 32B of a lengthwise direction is laid on the wastewater material 32A of a transverse direction. And the both ends of a transverse direction are made to project from the slope 44 of the banking 42, and let them be the exhaust ports 46. [at least] When the lengthwise direction 32B also has a slope in the longitudinal direction side, an end may be made to project and an exhaust port (not shown) may be formed also in the longitudinal direction side. A concrete block and 50 are drainage pavement 48 among a figure.

[0042]It is desirable for the linear heater 38 to carry out parallel wiring of any [of the above] case. Distinction of a locating fault is easy, and when it breaks down, it is for ending with partial repair. When outside air temperature turns into prescribed temperature (for example, -5 ** or less), it is made to energize automatically to the line top heater 38 with an operator control panel.

[0043]Next, the operating mode of the above-mentioned embodiment is explained taking the case of the case of a highway bridge.

[0044]The water which permeated between the pavement slab 20 and the water resistant layer 14 gathers to the wastewater material 32 provided with the capillary action, and is further drained out of the system of engineering-works equipment (highway bridge) via the wastewater pipe 24 from the end 13 of the wastewater material 32 in response to a capillary action to the catch basin 26.

[0045]as compared with conventional spiral steel, it is markedly alike, and the section of the wastewater material 32 which is a means of water disposal at this time is large, and since it catches stagnation water by a capillary action, the amount of water flow is secured and the smooth wastewater of it is attained.

[0046]When it becomes the temperature environment which the water of adhesion to wastewater material freezes, by making a heater energize, freezing can be prevented certainly and there is no stagnation of the water accompanying freezing.

[0047]

[Function and Effect of the Invention]Like the above, the hydrophilic linear object of a book pulls, and many wastewater material is arranged, or the wastewater material of this invention consists of a string-like object twisted and formed, Water is made to invade from the surface side and the following operation and effects are generated along with the longitudinal direction of a string-like object by composition which is carrying out burial retention of the linear heater in what is constituted so that the crevice between said hydrophilic linear objects may be moved for this water to a system outside direction.

[0048]as compared with conventional spiral steel, it is markedly alike, and the section of the wastewater material which is a means of water disposal is large, and since it catches stagnation water by a capillary action, the amount of water flow is secured and the quick and smooth wastewater of it is attained.

[0049]When it becomes the temperature environment which the water of adhesion to wastewater material freezes, by making a heater energize, freezing can be prevented certainly and there is no stagnation of the water accompanying freezing.

[0050]Therefore, quick ***** of the water which permeated between on a water resistant layer via pavement slab is made, and, moreover, it can prevent completely [freezing in winter].

[0051]Therefore, in the intense-cold place in winter, there is no possibility that seepage water is frozen, and a protuberance thru/or a cave-in may occur when extreme, the crack of the pavement slab 20 and. road surface freezing in winter can also be prevented secondarily -- especially -- the above -- it contributes not only to a paved surface injury but to slip accident prevention seriously by laying under the pavement slab in a highway bridge, a peak, and a tunnel entrance which a road surface [like] tends to freeze partially.

[0052]When it is used having laid under the banking, the effect which can prevent the partial protuberance by

freezing of banking, etc. certainly is generated.

[Brief Description of the Drawings]

[Drawing 1] The part plan of a suitable highway bridge to apply the wastewater material of this invention

[Drawing 2] The outline end elevation of two to 2 line of drawing 1

[Drawing 3] Similarly it is an outline end elevation of 3-3 line.

[Drawing 4] The perspective view showing one mode of the wastewater material of this invention

[Drawing 5] The perspective view showing other modes of the wastewater material of this invention

[Drawing 6] The sectional view showing the drainage structure of banking to which the wastewater material of this invention is applied

[Drawing 7] It cuts by the part which shows an example of the linear heater used for the wastewater material of this invention, lacks, and is a perspective view.

[Explanations of letters or numerals]

12 Basic base

14 Water resistant layer (tarpaulin)

16 Basis of pavement slab

20 Pavement slab

23 Means of water disposal

32 Wastewater material

34 Hydrophilic linear object

35 Glass fiber bunch (strand bunch)

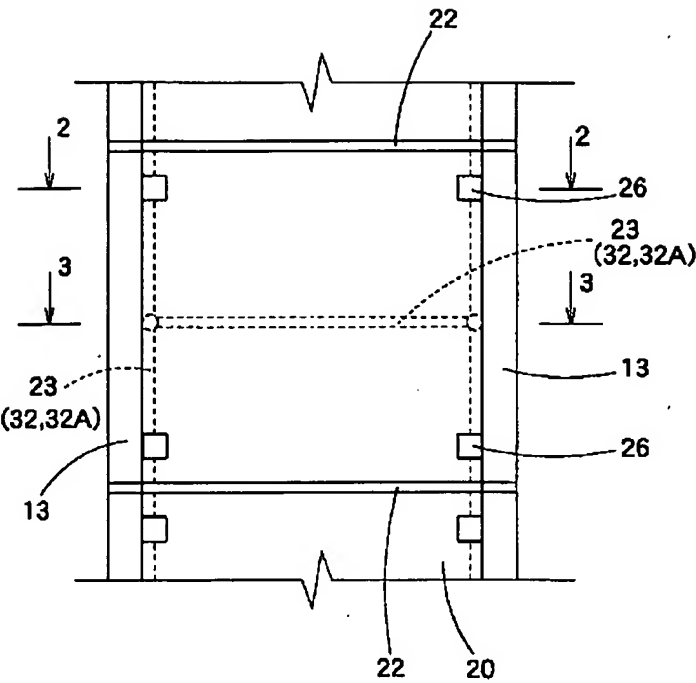
37 Bind and it is a member (flexible tube-like object).

38 Linear heater

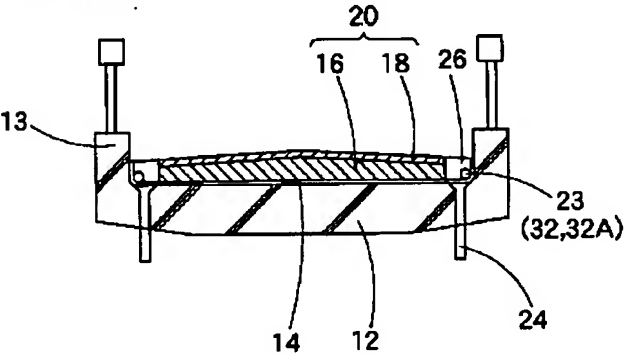
42 Banking

50 Drainage pavement

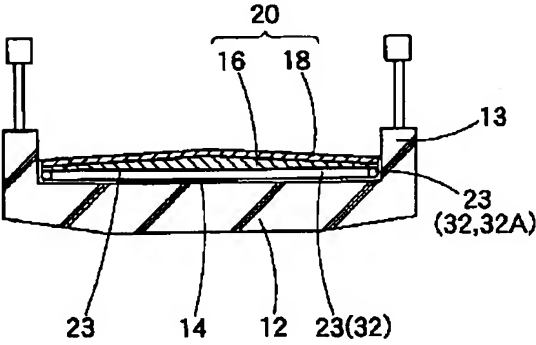
[Drawing 1]



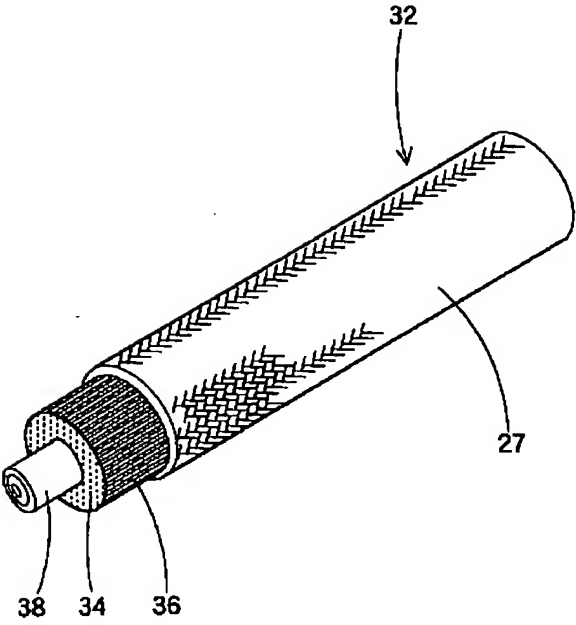
[Drawing 2]



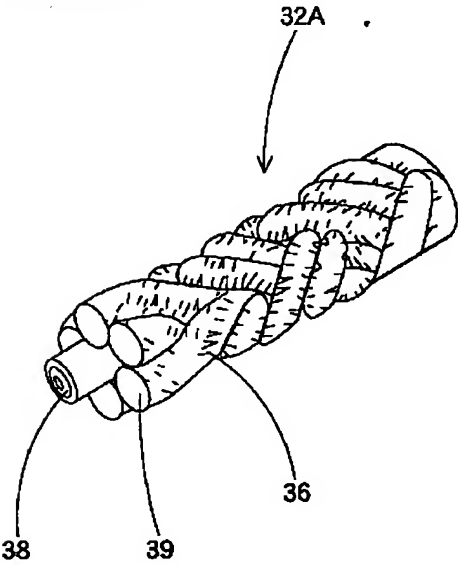
[Drawing 3]



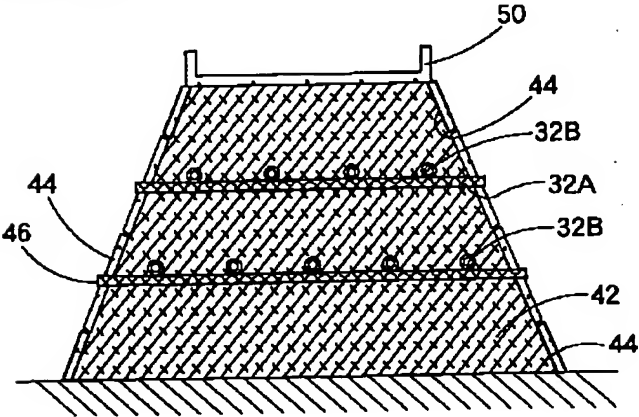
[Drawing 4]



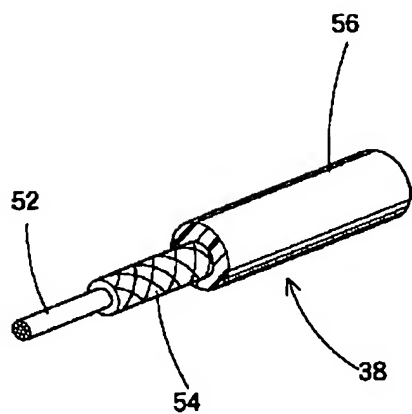
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]

Report Mistranslation

Japanese (whole document in PDF)